

almost one-half that of GSO systems."^{28/} Although AMSC's curious assertion seems to contradict its own position, it also paints an inaccurate picture of the propagation delay situation. Fully 155 milliseconds of the delay AMSC calculates is attributable to CODEC processing and formatting, a function that geostationary systems must also provide.^{29/} In any case, such a delay (exclusive of CODEC processing) pales in comparison to the 270 millisecond propagation time delay that AMSC's system will produce -- a delay which exceeds the typical propagation time delay created by non-geostationary systems (again exclusive of CODEC processing) by between 85 and 260 milliseconds.

Finally, the "many inter-service sharing problems" that AMSC foresees for non-geostationary systems^{30/} are inevitable in the establishment of any new service, and continue to face AMSC as well. Although AMSC's system will be capable of serving only North America, it is by no means immune from the "international sharing difficulties" that it claims the non-geostationary systems

^{28/} Id.

^{29/} Id. In order to reduce its voice communications delay significantly, AMSC would have to choose to compress voice signals to a much lesser degree than do non-geostationary systems. Such a decision would render AMSC's system even more spectrum inefficient than it already is. See Attachment A, TRW Technical Appendix at A-4.

^{30/} See AMSC Comments at 33-34.

face.^{31/} In fact, AMSC is beset by enormous and longstanding problems in coordinating its system with, inter alia, INMARSAT, Canada, Mexico and the Russian Federation. Nowhere has AMSC suggested that it should be denied the opportunity to build its own satellites because of these problems.

There is also no basis for AMSC's assertions that geostationary systems are in some way "more economical" than non-geostationary systems,^{32/} or that they can offer comparable benefits to the U.S. economy.^{33/}

- The best measure of a system's capacity for economy is in the rates it will charge its customers, and the rates that Odyssey and most other non-geostationary systems will charge will be substantially below those to be charged by AMSC.^{34/}
- AMSC's insinuation that only geostationary systems develop in an "incremental" fashion that minimizes economic risk^{35/} is false; Odyssey in particular will have the capability to offer a

^{31/} Id., and Technical Appendix thereto at 13.

^{32/} See id. at 22.

^{33/} Id. at 25.

^{34/} See, e.g., Consolidated Response of TRW Inc., File Nos. 15-DSS-MP-91, et al. (March 27, 1992) at 22 (comparing AMSC's proposed charge of between \$1,500 and \$3,500 for a transceiver unit and of \$2-4 per minute for service to Odyssey's then-proposed charge of between \$550 and \$1,000 for a transceiver unit and \$.65 per minute for service; Odyssey's current estimate for the cost of its transceiver units is considerably lower).

^{35/} See AMSC Comments at 22-23.

commercial grade of service well before its full constellation is launched.^{36/}

- AMSC's description of the cost estimates of non-geostationary systems as "largely speculative" is not appropriate in the case of Odyssey;^{37/} TRW is an established manufacturer of communications satellites with a sound understanding of satellite costs, and TRW has based Odyssey cost estimates on realistic and comprehensive reviews of all program elements. Moreover, other parties making projections challenged by AMSC have satellite industry experience.
- Virtually every commenter agrees that the inherently global nature of non-geostationary systems, the new markets they will open, the greater numbers of people they will employ, the foreign investment they will attract and the technological advantage they will give to the United States all will have a positive impact on the U.S. economy, and that geostationary systems simply cannot offer such benefits.^{38/}

Finally, the Commission must reject AMSC's claims that the non-geostationary systems that have been proposed in the MSS/RDSS bands cannot satisfy the Commission's proposed technical and financial standards for MSS Above 1 GHz service. In the first place, those standards are the subject of the instant rulemaking proceeding, and therefore need not yet be met by any applicant. In the second,

^{36/} Odyssey will be capable of initiating commercial service with only six satellites, one-half of its planned constellation.

^{37/} See AMSC Comments at 23. AMSC's claim regarding the "short useful life of non-GSO satellites" does not apply to Odyssey, whose Medium Earth Orbit satellites will have lifetimes of between 10 and 15 years. Id.

^{38/} See, e.g., Constellation Comments at 5-7; Conus Comments at 1-2; Mathis Comments at 1; Motorola Comments at 11-14; LQP Comments at 17-19; TRW Comments at 23-25.

whether or not a system proposal meets the standards that the Commission ultimately adopts is a matter that the Commission must consider when it evaluates an individual application, and not before.

2. In General, The Commission's Technical Coverage Standards Provide a Balanced, Objective Means Of Ensuring "Universal" Access Without Mandating Unnecessarily Restrictive and Subjective Service Requirements.

In its Comments, TRW generally endorsed the Commission's decision to impose a global coverage requirement, and to base fulfillment of this requirement upon an objective coverage capability standard.^{39/} TRW also suggested that the domestic standard should be identically defined, i.e., based on coverage capability rather than the ability to provide a particular type of service.^{40/}

The Commission should adopt its initial proposal, incorporating the clarifying modifications proposed by TRW and supported by several other commenters addressing this issue.^{41/} The coverage capability standard based on simple,

^{39/} See TRW Comments at 26-31.

^{40/} See TRW Comments at 31-32.

^{41/} See Constellation Comments at 37-39; LQP Comments at 19-21. Both Constellation and LQP, along with Ellipsat (see Ellipsat Comments at 31-32), propose narrowing the latitudes to which MSS Above 1 GHz systems would be required to provide coverage, an idea which TRW also supported in principle -- despite the fact that Odyssey meets the currently proposed requirement. TRW continues to believe that a less extensive range of coverage may be appropriate, although it does not specifically endorse any particular alternative proposal advanced along these lines.

objective criteria is a pragmatic and rational approach to establishing a threshold requirement, which avoids unnecessarily complicated or subjective criteria.

Satellite visibility is a reasonable and easily identifiable indicator of a system's general capability to bring service to an area. Application of a more subjective standard necessarily would involve the consideration of a host of complex factors that not only apply differently to each system design (e.g., link margins), but would vary within each system according to geographic and environmental factors, including the local propagation environment, the satellite elevation profile (as opposed to a single, minimum value of elevation angle), and the presence of potential sources of interference. It is likely that this complex technical analysis would cause the Commission to become mired in insoluble disputes, and ultimately lengthy litigation, concerning the applicability of the requirements to each applicant's proposed system -- a speculative exercise doomed from the outset to produce no definite answers.^{42/}

For these reasons, the Commission should specifically reject as both unwarranted and unworkable the various self-serving alternative rules advanced by several applicants. The alternative or additional requirements proposed by Motorola and Ellipsat would impose upon the entire MSS Above 1 GHz service requirements that are offered not for the purpose of reaching optimal processing procedures and service rules, but solely for the transparent purpose of creating advantages out of the

^{42/} See Constellation Comments at 38.

peculiar characteristics of their own system proposals (to the arbitrary disadvantage of one or more other applicants).

a. **The Commission Should Not Adopt An Unwarranted, Undefined "Service" Requirement.**

Motorola seeks to have the Commission impose as a threshold technical qualification criterion a requirement that MSS Above 1 GHz systems provide "global service" rather than global coverage capability, as initially proposed.^{43/} Among the flaws in this proposal is that Motorola itself fails to define adequately what it means by "service." In applying such a standard, the Commission would need to make inquiry into the specific service offerings possible under each applicant's proposal, and decide, absent concrete guidelines, whether they fall within the generic MSS definition set forth in Part 2 of the Commission's Rules.^{44/}

TRW believes that determining what constitutes "service" is a decision that is best left to the marketplace -- in particular, purchasers of space segment capacity and their customers, whose needs will dictate the types of offerings that are

^{43/} Compare Motorola Comments at 18 and TRW Comments at 28.

^{44/} The Commission's rules define *Mobile-Satellite Service* as "A radiocommunication service: (1) Between mobile earth stations and one or more space stations, or between space stations used by this service; or (2) Between mobile earth stations by means of one or more space stations." 47 C.F.R. § 2.1(c) (1993).

ultimately provided via the MSS Above 1 GHz systems.^{45/} This approach is necessitated by more than prudential concerns. Because it is the purchasers of capacity provided by the MSS Above 1 GHz system licensees that will actually provide service to the public, any attempt to impose a defined global or domestic "service" requirement on the capacity providers would be misplaced, as these entities will not typically provide "service" to the end-user customers who are the object of a global service standard.^{46/}

To the extent that particular systems may have capabilities that would support more sophisticated or feature-rich services to end users, this will only redound to their advantage in the marketplace -- at least if such services are in demand and are economically feasible. The Commission, however, should not attempt to promulgate standards that would require all applicants to demonstrate the ability to accommodate service providers that may wish to offer a particular type or level of service.^{47/}

^{45/} See also Ellipsat Comments at 31 ("The Commission should avoid specific criteria which may limit operators' flexibility to identify and serve market demand").

^{46/} Because it ignores the fact that its own service concept would not provide such service to end-users, Motorola's suggestion that an end-user oriented service requirement be imposed is in conflict with its correct analysis of the regulatory scheme that is appropriate for the MSS Above 1 GHz service. See Motorola Comments at 61-67.

^{47/} The Commission, for example, should reject Ellipsat's proposal to require all MSS Above 1 GHz licensees to provide radio-determination service. See Ellipsat Comments at 19 n.19. This capability is not necessary to provide MSS generally and, as discussed above, the Commission should not prejudge the market by requiring each licensee to incorporate technology to accommodate mandatory service offerings.

Such an over-inclusive standard would make it more likely that "basic service" would be available only to the well-heeled few, leaving unserved many other potential customers who might otherwise have benefitted.

For similar reasons, TRW sees no need to adopt additional requirements for domestic operations. For example, the Commission's apparent decision to limit required domestic coverage to "the fifty states" is reasonable and practical, and should not be extended to encompass every outlying territory that falls within U.S. dominion. If one or more U.S. licensees determines that it is not practical or efficient to redesign its system to guarantee service 100 percent of the time to such distant domestic points as Guam, that should not condemn its application to dismissal. In addition, for the same reasons that the global requirement should be limited to coverage, the Commission should decline to adopt a specified level of domestic "service" that each system must accommodate.^{48/} It is simply impossible for any regulatory agency to

^{48/} Several commenters have requested that the Commission adopt emergency radiolocation, i.e., Enhanced 9-1-1 service ("E-911"), as an additional MSS Above 1 GHz requirement. See Comments Office of the Attorney General, State of Texas ("Texas AG Comments"); Comments of the United States Coast Guard ("Coast Guard Comments"); Comments of Bernard J. Trudell ("Trudell Comments"). The Texas Attorney General's Office notes that the Commission raised the issue of E-911 in its Second Report & Order with respect to the Personal Communications Services ("PCS"), where the Commission declared that it would explore this issue in a separate proceeding. See Amendment of the Commission's Rules to Establish New Personal Communications Services, 8 FCC Rcd 7700, 7756 (1993); Texas AG Comments, Attachment at 2 (Petition for Reconsideration in GEN Docket No. 90-314). The Texas Attorney General sought reconsideration in that proceeding, and raises the same arguments here concerning E-911, supported by the Coast Guard and (continued...)

designate, wholly apart from real-life market conditions, the myriad factors that would have to be considered in each instance of "service" availability.

Finally, the Commission should decline to adopt the specific domestic efficiency standard offered by LQP,^{49/} which Odyssey would easily meet in any case. The establishment of any particular number of circuits as the standard would necessarily be arbitrary, and the utility of adopting it doubtful. As TRW observed in its initial Comments, each system operator will naturally endeavor to provide as many channels as possible consistent with the maximization of economic efficiency.^{50/}

^{48/}(...continued)

Mr. Trudell. See Coast Guard Comments at 2; Trudell Comments at 2.

Although these parties are undeniably well-intentioned, TRW believes that introduction of E-911 issues into this proceeding is inappropriate, given the fact that the key feature of MSS Above 1 GHz is its ability to provide global, long distance communication -- as opposed to the local and regional service that most PCS licensees will, and current cellular radio licensees do, provide. Emergency radiolocation would not appear to have the same type of benefit where international calling is involved. For example, it is difficult to see any utility in the capability of the Houston Fire Department to receive and trace distress signals transmitted by a businessman travelling in Vladivostok, Russia. This is not to say that MSS Above 1 GHz service licensees will not play an important role in emergency location, simply that these systems will be ill-suited to the inherently local E-911 model. In any case, Odyssey will employ dual mode handsets which would have the capability to shift to the local wireless system in order to transmit distress signals to local rescue agencies. Thus, the Commission should not mandate that MSS Above 1 GHz licensees provide E-911, either in this proceeding or in any separately initiated proceeding.

^{49/} See LQP Comments at 22-24.

^{50/} See TRW Comments at 35.

For all of these reasons, the Commission should clarify that its proposed technical standards merely require applicants to demonstrate in their applications that they are capable of providing both global and domestic coverage. The Commission must not mandate that each applicant's system proposal be capable of accommodating a service provider that wishes to offer a particular type of service.

b. The Commission Need Not Alter The Elevation Angle That It Has Proposed As A Measure of Coverage Capability.

Both Ellipsat and Motorola, in the name of ensuring "global service," proffer unnecessary alterations of the Commission's proposal to establish coverage capability based on those areas of the world to which each system will have a satellite visible at an elevation angle of 5° or greater above the horizon. Ellipsat proposes higher elevation angles, while Motorola proposes variable elevation angles -- requiring the Commission to verify engineering showings of each applicant with respect to their varying capabilities "to provide service." Neither of these proposals should be adopted.

With respect to Ellipsat's proposal to require elevation angles of 15° globally and 25° within the United States, Ellipsat has offered no basis for its conclusion that these angles constitute a minimum threshold at which the capability to provide service is likely. Instead, it states merely that "elevation angles of greater

than 5° are needed if the Commission's objective is to mandate a minimum service level." Ellipsat Comments at 32.

As discussed in the foregoing section, the complexity of this issue makes the mandate of an actual "minimum service level" impractical -- a point that is demonstrated by Ellipsat's follow-on statement that the Commission should adopt a standard "that actually ensures a minimal satisfactory quality of service where there is a market for that service." Id. (emphasis added). Ellipsat does not explain how this determination can be made before markets have actually developed, and itself quotes with favor just two pages later the Commission's conclusion in the Non-Voice, Non-Geostationary MSS ("NVNG MSS") proceeding that "it is not 'efficient' to mandate . . . a level of . . . service that may not be supported by the market."^{51/} Thus, Ellipsat has provided no basis for acceptance of its proposal, and indeed has provided cogent arguments against it, which are more fully addressed by TRW in the preceding section.

Motorola's proposal that the minimum elevation angle required be variable according to system design is even more dramatically impractical. As also noted in the preceding section, service capability for each system -- however "service" may be defined -- is likely to vary within each system design dependent upon myriad

^{51/} Id. at 34 (citing Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service, 8 FCC Rcd 8450, 8456 (1993) ("NVNG MSS Report and Order").

other factors of which Motorola evidences no consideration. Thus, a single system-specific "service elevation angle" is not accurately calculable, and the attempt to reduce such a complex analysis to a single value to be certified by each applicant is not reasonable. Adoption of such a requirement would be a prescription for a decade of litigation focused on the utility and accuracy of complicated mathematical calculations.

**c. The Commission Should Not Require Construction Of
Ground Segment Facilities In Foreign Countries As A
License Condition.**

Motorola also proposes an additional "technical" requirement that would actually amount to an extra system implementation milestone -- requiring each applicant to certify that it will establish ground segment facilities "in countries representing at least 75% of the surface area and population of the world within six years."^{52/} Motorola provides no justification for imposing such a broad requirement, particularly where successful fulfillment of this milestone does not lie solely with the applicant, but is also dependent upon the grant of authorizations by

^{52/} Motorola Comments at 19.

foreign administrations.^{53/} The Commission cannot realistically expect that each applicant would be able to obtain landing rights in every country.

The service implementation plans of U.S. licensees for specific nations should not be influenced by the sort of "gun to the head" mandate that Motorola proposes. Such a requirement would have a definite adverse impact upon the U.S. licensees, which could be forced to conclude arrangements with foreign gateway providers at an accelerated pace, and very likely on unfavorable terms.

Most significantly, there is simply no reason to add an extra level of complexity to the Commission's proposal. There can be no question that a permittee that has met the requirement to provide global coverage, and that proceeds to construct and launch such a system, will also seek to operate it in a manner that realizes the maximum commercial benefits of system operation. Permittees that launch satellites will thus seek to provide access to service providers in as many countries as feasible, i.e., to the extent that there are markets for such services.

^{53/} One of the significant problems inherent in Motorola's approach is illustrated by the fact that it proposes that each licensee be required to conclude ground segment agreements with countries representing both 75 % of the world's land area and 75 % of the world's population, thereby magnifying the importance of particular nations to the achievement of this milestone. For example, because the People's Republic of China not only covers a significant portion of the world's land area, but accounts for nearly a quarter of the world's population, Motorola's ill-considered suggestion would result in a virtual requirement that each U.S. permittee obtain authority to operate in China. Thus, it would give a foreign government near plenary power to determine which of the MSS Above 1 GHz systems would continue to be eligible for a U.S. license!

No further regulations are necessary in order to facilitate the Commission's goal of global system coverage.

B. FINANCIAL QUALIFICATIONS

1. Most Parties Agree With TRW's Position That The DOMSAT Financial Standard Does *Not* Include A Requirement That Assets Be Uncommitted.

In its Comments, TRW demonstrated that the inclusion of the adjective "uncommitted" in paragraph 27 of the Commission's NPRM (purportedly describing the Domsat financial standard) was not only inappropriate, but contravened the very standard the Commission proposed to adopt.^{54/} Virtually all parties commenting on this issue agreed with TRW's analysis of the matter.^{55/} Thus, in view of the fact

^{54/} See TRW Comments at 37-41.

^{55/} See, e.g., Comments of Motorola at 25-27; Comments of Constellation at 41; Comments of LQP at 25-27. Only Ellipsat seeks to impose a new and excessive requirement that corporate applicants' funds be specifically committed to the applied-for project. See Comments of Ellipsat at 44-45. The asserted reason for its obviously inconsistent position (compare Ellipsat's request at pages 40-42 of its Comments that projected revenues and future financing be allowed to be used to demonstrate financial capability) is the alleged inequity between applications filed by large corporations with substantial asset bases and small, start-up companies with little financial wherewithal. The weaknesses in the Ellipsat position are readily apparent: (1) there is nothing in the Communications Act or Commission policy which either warrants or justifies an approach directed solely at "equalizing" applicants as opposed to protecting the public interest; (2) imposing a requirement that the Commission rejected some ten years ago as not being in the public interest serves no purpose other than Ellipsat's and would likely result in **no** applicant being found financially qualified; and (3) the perceived inequality in treatment simply does not exist since Ellipsat may rely on the intended contributions of all of its equity and non-equity

(continued...)

that neither Section 25.140 of the Commission's Rules nor the 1985 Domsat Order requires that assets be *uncommitted*,^{56/} the Commission should delete the objectionable reference as serving no valid public interest purpose.^{57/}

2. Most Parties Also Agree That The Financial Standard Should Be Geared To The System Costs Necessary To Commence Commercial Service.

Given the financial standard recently adopted for the NVNG MSS service, and the Commission's dual public policy concerns underlying this eligibility criterion -- prompt initiation of service to the public and use of the orbit-spectrum

^{55/}(...continued)

partners. Not being applicants themselves, however, the Commission in such cases properly asks that such parties specifically commit to follow-through on their promises.

^{56/} See 47 C.F.R. § 25.140(c) (1993); Licensing Space Stations in the Domestic Fixed-Satellite Service, 58 R.R. 2d 1267 (1985) ("1995 Domsat Order").

^{57/} In this connection, LQP proposes that the Commission define "current assets" as "cash plus other assets reasonably expected to be realized in cash or sold or consumed during a normal operating cycle of a business" (see LQP Comments at 27), on the assumption that it is the definition used by the Commission in its 1985 Domsat Order. Id. at 27 (citing 1985 Domsat Order, 58 R.R. 2d 1267 at ¶13 n.24). The Commission, however, was there using the definition pronounced in "#43 Accounting Research Bulletin, Chapter 3, para. 4 (June, 1953)." Since that time the Financial Accounting Standards Board has modernized the definition of "current assets" to include: cash, secondary cash resources, inventories, receivables, and prepaid expenses (including prepaid insurance, interest, rents, taxes, advertising and operating supplies). See Martin A. Miller, HBJ Miller Comprehensive GAAP Guide 1992, 8.01-8.02 (1991). In determining eligibility criteria for a new and innovative satellite system in the 1990s, the Commission should not be using a definition that dates from 1953. Rather, TRW submits that the definition of "current assets" now in use under the Generally Accepted Accounting Principles is the appropriate one for use in 1994.

resource -- TRW also proposed that the financial test adopted by the Commission for MSS be based only on that part of the satellite system that is needed to provide commercial service over the United States.^{58/} TRW there demonstrated that the Commission's public interest objectives would clearly be served by this proposal.

Other commenters generally support TRW's position. For example, Constellation also urges that the financial standard to be adopted cover only that number of satellites needed "to commence a commercial service."^{59/} Ellipsat, arguing for application of an eligibility standard that relies on "progressive deployment," requests that a similar approach be adopted.^{60/} And although Motorola requests that first year operational costs be gauged from the launch of the last satellite in the constellation,^{61/} it does so only because in its view "LEO systems can only become fully operational, and able to generate revenues, once the entire constellation is in place."^{62/} This may be true only for Motorola. TRW can, in fact, begin commercial service with only six satellites, and it appears that most

^{58/} See TRW Comments at 41-45.

^{59/} Constellation Comments at 40.

^{60/} Outlining three options, Ellipsat's first alternative involves "a financial showing under the domsat standard for a portion of the system required to introduce commercial service," noting that for the NVNG MSS, the Commission accepted a 10% communication capability within U.S. borders as sufficient. See Ellipsat Comments at 40 & n.51.

^{61/} Motorola Comments at 25-26

^{62/} Id. at 26 n.23.

if not all of the other non-geostationary applicants can commence service, and obtain the benefits of the resulting revenue stream, with less than their full constellations of satellites.^{63/}

The weight of evidence, therefore, supports the revised financial test that TRW has urged. It recognizes the realities of the marketplace and, at the same time, implements the well-founded principle that has guided the Commission in the satellite field: an evaluation of the specific service being considered.^{64/}

^{63/} AMSC, which appears to take issue with every applicant's financial situation save its own, argues that because non-geostationary satellites "typically have a very short useful life," the Commission should require that the financial standard be extended to replacement satellites constructed and launched "in the first few years of operation." AMSC Comments at 32. Whatever relevance AMSC's contention may have for other applicants' systems, the fact remains that its argument is inapplicable to TRW's Odyssey system, which will be designed with a ten to fifteen year satellite life (a design life that is comparable to most geostationary satellites now operating). AMSC's contention merely emphasizes that each system must be treated on its own merits for financial qualification purposes.

^{64/} See TRW Comments at 42 & n.66.

II. SPECTRUM SHARING PLAN

- A. **ALTHOUGH THERE IS GENERAL AGREEMENT THAT THE COMMISSION'S 11.35/5.15 MEGAHERTZ SHARING PROPOSAL SHOULD PROVIDE AN ACCEPTABLE SOLUTION TO SHARING THE ENTIRE 1610-1626.5 MHZ BAND, THE COMMENTS VERIFY THE NEED FOR THE PRESENT IDENTIFICATION OF A TRANSITIONAL ACCOMMODATION OF THE GLONASS SYSTEM AND CERTAIN OTHER MODIFICATIONS TO THE COMMISSION'S PROPOSAL.**

TRW and each of the other four applicants for non-geostationary MSS Above 1 GHz service systems acknowledged the general acceptability of the Commission's proposal to assign an 11.35 megahertz segment of the 1610-1626.5 MHz band to the four applicants proposing to employ CDMA modulation techniques for use on a full-band interference sharing basis, and 5.15 megahertz to the one applicant that requires exclusive spectrum because it proposes to use FDMA/TDMA modulation techniques.^{65/} TRW looks upon this general acceptance as a very positive development, and one that bodes well for the prospects for a compromise resolution of the mutual exclusivity that currently characterizes the various applications for MSS Above 1 GHz satellite systems.

^{65/} See, e.g., TRW Comments at 47; Motorola Comments at 34-35. For ease of reference, the Commission's band segmentation proposal for the full 1610-1626.5 MHz band will be identified herein as the "11.35/5.15 plan."

Although the applicants for non-geostationary MSS Above 1 GHz systems each indicated general acceptance of the 11.35/5.15 plan, each also made clear that its acceptance of the plan was subject to certain conditions. For its part, TRW argued that the current realities of the interservice sharing environment at 1610-1626.5 MHz require -- as an absolute prerequisite to the adoption of a sharing plan to cover the entire 16.5 megahertz -- the establishment of a formal plan that accounts for the operation of the Russian GLONASS aeronautical radionavigation satellite system in frequencies below 1616 MHz. TRW also argued that the Commission must redress a number of gross inequities in the interrelationship between the CDMA and FDMA/TDMA segments under the proposed 11.35/5.15 plan that would apply to a 1610-1626.5 MHz band that is fully available for MSS Above 1 GHz operation. See TRW Comments at 47, 56-71. Three other parties -- Ellipsat, Constellation, and LQP -- identified measures to address the GLONASS issues as preconditions of their acceptance of the 11.35/5.15 plan.^{66/} Additional conditions proposed by the applicants included expeditious initiation of CDMA-CDMA and CDMA-FDMA/TDMA coordination;^{67/} revision of the Commission's proposal to require a sole surviving CDMA system to relinquish 3.1 megahertz of spectrum;^{68/} and

^{66/} See Ellipsat Comments at 3-4; Constellation Comments at 18-30; LQP Comments at 30-31.

^{67/} See, e.g., Constellation Comments at 27-28.

^{68/} See, e.g., LQP Comments at 38-41; Motorola Comments at 40-41.

authorization of the full 16.5 megahertz at 2483.5-2500 MHz for use by the CDMA applicants for their downlinks.^{69/}

TRW stands behind the reasoned and comprehensive analysis of the myriad sharing issues that it presented in its Comments, and does not intend to reiterate here every position it took in that filing. Instead, TRW will endeavor to limit this aspect of its Reply Comments to an exposition of those matters on which it does not agree with other parties, and to the provision of support for certain other matters that have been broached in the comments.

^{69/} See, e.g., Ellipsat Comments at 24-26.

1. The Commission Must Develop A Plan That Will Apply Until The GLONASS Issue Is Resolved; Motorola's Opposition To A "Transitional Plan" Is Both Self Serving And Wholly Without Credibility.

No commenter disagrees that the Commission's proposal to protect GLONASS to the degree contemplated in the NPRM would render the 1610-1616 MHz segment of the 1610-1626.5 MHz band virtually unusable for MSS Above 1 GHz operations. The disagreement among the commenters occurs in the area of what steps the Commission should take in its initial Report and Order establishing service rules for the MSS Above 1 GHz to address the GLONASS situation.^{70/}

In its Comments, TRW identified the Commission's failure to provide a definitive plan to accommodate the MSS Above 1 GHz service sharing environment that will exist until such time as the GLONASS system is successfully transitioned to frequencies below 1610 MHz as a fatal shortcoming of the spectrum sharing proposal laid out in the NPRM. See TRW Comments at 56-57. TRW urges the Commission to heed the call of the majority of MSS Above 1 GHz applicants, and act now to

^{70/} In the NPRM, the Commission assumed that the entire 1610-1626.5 MHz band would be available for MSS Above 1 GHz use in the "long term," and recognized that "a GLONASS transition to bands below 1610 MHz may not be completed when the first MSS satellites are launched" NPRM, 9 FCC Rcd at 1110 (¶ 31) & n.59. It identified an approximate division of the 1616-1626.5 MHz band that could be used as the foundation for an interim spectrum sharing plan if the 1610-1616 MHz band "is not immediately available to MSS Above 1 GHz operators" Id. at 1111 (¶ 32) & n.64.

address the substantial issues posed by the continuing co-frequency operation of the GLONASS system at 1610-1616 MHz.

a. Most Of The Applicants Agree That Some Action Must Be Taken Now To Account For The Fact That GLONASS Operations Will Remain A Factor At 1610-1616 MHz For The Near Term.

As an initial matter, the comments make clear that GLONASS is an impediment to MSS Above 1 GHz operations that is of indefinite duration. Although indications are strong that the U.S. Government will ultimately prevail upon the Russian Federation to reconfigure the GLONASS system's frequency plan such that GLONASS will not require protection of communication channels in frequency bands above 1610 MHz, the fact remains that there is not presently either any actionable assurance that this reconfiguration will occur or any generally-accepted timetable for such a reconfiguration.

Comments filed by representatives of the aviation community -- namely, the Federal Aviation Administration ("FAA"), Rockwell International Corporation ("Rockwell"), and Aeronautical Radio, Inc., et al. ("ARINC") -- confirm both the progress toward the shift of GLONASS out of the 1610-1616 MHz segment, and the fact that there is no way of knowing by when, or how complete, such a shift will be.^{71/} The FAA in particular notes that even though progress toward a shift of

^{71/} See FAA Comments at 2; Rockwell Comments at 3; ARINC Comments at 3-4.

GLONASS out of the 1610-1616 MHz band is being made, and could be accomplished "by the turn of the century[,]" delays may ensue by virtue of the fact that the GLONASS satellites currently in operation would have to be replaced with newer "GLONASS-M" satellites before the frequency adjustments could be achieved in full.^{72/}

The reactions to the GLONASS situation ranged from the pragmatic to the fanciful. TRW, Constellation, and Ellipsat all took the position that the Commission must adopt a method for transitioning to its 11.35/5.15 plan that would apply until such time as the Commission could objectively determine that MSS Above 1 GHz systems need no longer avoid use of the 1610-1616 MHz segment in order to protect GLONASS operations. TRW proposed a flexible and equitable sharing plan that would both cover the current applicants in the situation where only the 1616-1626.5 MHz band were available for MSS Above 1 GHz use, and provide for the complete or incremental expansion of the service into the 1610-1616 MHz segment as the GLONASS shift downward occurred. See TRW Comments at 73-78. Ellipsat supported the "foundation" plan that was sketched out for the 1616-1626.5 MHz band

^{72/} FAA Comments at 2.

in the NPRM.^{73/} Constellation made a proposal that was similar to the starting point of the TRW Sharing Plan. See Constellation Comments at 25-26.

LQP took a slightly different tack from the other CDMA applicants. It called upon the Commission substantially to revise its proposed rules for protecting GLONASS in a way that effectively deprives GLONASS of protection from MSS Above 1 GHz operations in frequencies above 1610 MHz. See LQP Comments at 67-71.^{74/} LQP stated that if the Commission "adopts LQP's proposals, [it] will enable MSS to proceed without an interim uplink spectrum sharing plan." Id. at 66. Of course, the flip side of LQP's approach is that if the LQP regulatory proposals to minimize MSS Above 1 GHz system obligations with respect to GLONASS are not adopted in full in the Commission's forthcoming Report and Order, LQP would presumably support the establishment of an interim sharing plan.^{75/}

^{73/} See Ellipsat Comments at 3, 16 (citing NPRM, 9 FCC Rcd at 1111 (¶ 32) n.64). The FAA also supported the "foundation" plan outlined in the NPRM. See FAA Comments at 2 & n.5.

^{74/} Specifically, LQP implored the Commission not to protect GLONASS to levels above -15 dB(W/4 kHz) -- the level specified in both International Radio Regulation 731E and Proposed Section 25.213(c)(1); it called upon the Commission to revise the obligations to be imposed upon MSS Above 1 GHz systems by Proposed Section 25.143(b)(2)(iv); and it proposed reasonable out-of-band emission limitations to protect GLONASS operations in the 1598-1606 MHz band. LQP Comments at 67-70. TRW supports most of these proposals, but notes below that they are, in and of themselves, inadequate to solve the problem.

^{75/} Inasmuch as LQP's proposed revision to International Radio Regulation 731E would apply only in the United States Table of Allocations (see LQP Comments at 67-68), its proposals cover only domestic operations of MSS Above 1 GHz systems. LQP
(continued...)

b. Motorola's Opposition To A Transitional Sharing Plan Is Self Serving And Characterized By Simplistic Arguments That Lack Any Factual Foundation.

Motorola -- which has never proposed to use frequencies below 1616 MHz, and which would gain exclusive use of the MSS/RDSS band frequencies above 1621.35 MHz under the Commission's proposed sharing plan -- is the only current applicant to take the view that the interservice sharing obstacles posed by GLONASS are sufficiently resolved to enable the Commission to proceed directly to the licensing of MSS Above 1 GHz systems under the 11.35/5.15 plan. Motorola provided three reasons for opposing the implementation of an interim or sharing plan. It asserted that: "it is highly likely that the [FAA] will not authorize that GLONASS be used for aircraft approaches[;]" that "it is also highly likely that the Russian Administration will agree to change the GLONASS frequency plan to operate below 1610 MHz in order to protect RAS sites and successfully complete GLONASS-M coordination[;]" and that "the adoption of any interim plan pending the outcome of GLONASS-M coordination could create a disincentive for the Russian Administration to change the GLONASS frequency plan." Motorola Comments at 42 (citations omitted). It concluded that the Commission could therefore proceed with the

⁷⁵/(...continued)

does not explain how the domestic changes it advocates would be extended to the non-U.S. service areas of the proposed MSS Above 1 GHz systems.